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THE IMPACT OF FOREIGN DIRECT INVESTMENT AND TRADE OPENNESS ON ICT EXPANSION

Fraid Shirazi
Ryerson University, f2shiraz@ryerson.ca

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THE IMPACT OF FOREIGN DIRECT INVESTMENT AND TRADE OPENNESS ON ICT EXPANSION

A COMPARATIVE ANALYSIS OF ASIA PACIFIC AND MIDDLE EASTERN COUNTRIES

Abstract

This study investigates the impact of foreign direct investment (FDI) inflow and trade openness on the expansion of information and communication technologies (ICTs) for the period of 1996 to 2005, in the Asia-Pacific and Middle East regions. Asia-Pacific countries cited in this study are: China (mainland & Hong Kong), Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. The Middle Eastern countries cited include: Bahrain, Iran, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria and the United Arab Emirates (UAE).

The results of regression analyses conducted indicate that while dissimilarities exist among the countries included in this study in terms of their level of socio-economic and political development, factors such as trade openness, education and the growth of GDP had a positive impact on their ICT development. While FDI inflow had positive impact on the expansion of ICTs on Asia-Pacific countries its impact on Middle Eastern countries was not statistically significant.

The study results also show that governmental intervention in economic activities has a negative impact on ICT expansion in both regions. In the Middle East, regional conflict imposes additional negative impact on FDI inflow and trade openness and consequently, ICT expansion. The regression results show that those countries that implemented liberalization of their ICT sector were able to not only reduce the digital divide with other developed countries, but also increase their operations in both local and global markets.

Keywords: ICT, Digital Divide, Trade Openness, FDI inflow, conflict, intervention

1 INTRODUCTION

In the last decade, several countries in the Asia-Pacific region (countries of this study) witnessed a profound expansion of ICTs and FDI inflow (see Figure 1). Middle Eastern (ME) countries, on the other hand, were not able to attract FDI inflow to the same extent despite the expansion of ICT in the region and an increase in the capacity of FDI inflow within the period of 1996 to 2005. As shown in Figure 1, the FDI inflow in the Middle Eastern countries of this study accounted for 3% of the world's total FDI inflow in 2005 compared to 16.5% for Asia-Pacific countries. This is of particular importance to Middle Eastern countries due to the fact that they are anxious for such an investment flow in sectors such as oil and natural gas which are heavily dependent on ICT.

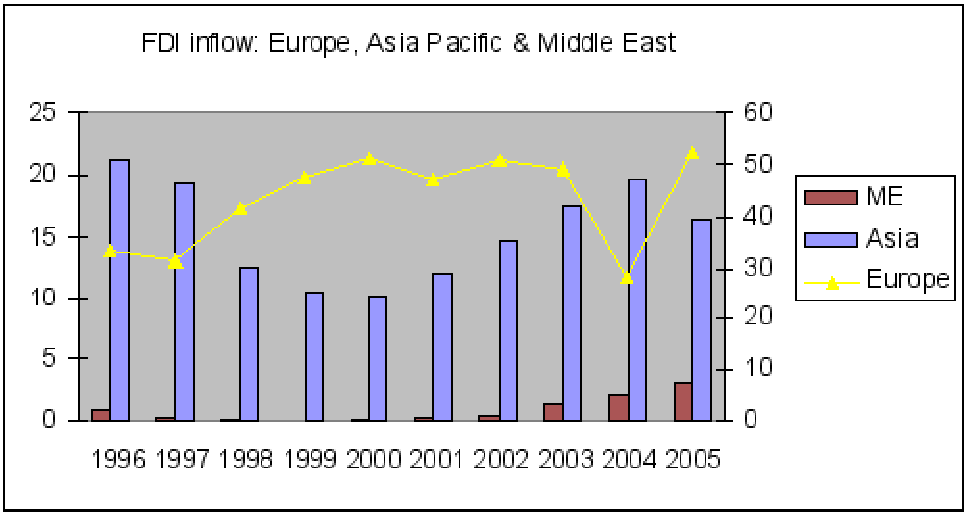

Figure 1. FDI inflow: Percentage of the World FDI, source: UNCTAD (2008)

In recent literature, FDI has been cited as a measure towards globalization (Loungani & Razin 2001) and trade liberalization (Santos-Apulino & Thrilwall 2004) that can provide development opportunities to host countries (Spoer et al. 2006). As developing economies become more open to international competition, organizations are increasingly forced to compete with transnational corporations (TNCs) in both domestic and foreign markets. In turn, FDI becomes an important component of their economic strategies (UNCTAD, 2006a). In the last decade, FDI outflow from emerging markets (so called South-South) has expanded drastically. According to UNCTAD (2006a) the rise of FDI from developing as well as transitioning economies is of particular relevance to low income countries as the total FDI outflows from these economies increased from approximately $4 billion in 1985 to $61 billion in 2004. Although most of these investments were destined for other developing or transitioning economies, most of the outflows remained within these economies. According to Delasnerie (2007), FDI flow in the Middle East and North Africa (MENA) accounted for less than 10% of total the FDI investment in 2007. Delasnerie (2007) also argues that 60% of investors consider MENA a high risk region due to factors such as the political situation in individual countries, poor infrastructure, corruption, fear of terrorism and problems with intellectual resources in areas such as R&D and other knowledge-based services.

Krogtrup and Matar (2005) claim that Arab countries are less likely to possess the absorptive capacity necessary to benefit from FDI, due to the poor quality of education, financial sector, technology and institutional development.

In order to investigate the impact of FDI inflow and other socio-economic factors on ICT expansion, this study raises three main questions: a) what is the main impetus behind the success of Asia-Pacific countries in attracting FDI inflow into their ICT development? b) what is the impact of FDI inflow and trade openness on ICT expansion? c) what is the impact of regional conflict on ICT development?
To this end, a regression model based on the literature in this area and UNCTAD World Investment Prospects Survey for 2007–2009 of TNCs was constructed. Through an empirical analysis, the model was adjusted to reflect the regression results.

This paper is organized as follows: Section 2 provides literature review on FDI impact and ICT expansion in developing countries, ICT expansion and FDI inflow in the Asia-Pacific and ME regions; Section 3 introduces the research approach; Section 4 provides regression results and findings and Section 5 provides discussion and conclusions based on these findings.

2 FDI INFLOW AND ICT EXPANSION

2.1 Impact of FDI Inflow and ICT Expansion in Developing Countries

Addison and Mavrotas (2004) argue that FDI contributes to the UN Millennium Development Goals (MDGs) by increasing employment opportunities and thereby reducing poverty. FDI also provides a source of revenue to host countries for public spending on human capital, particularly in the area of basic health care and education. FDI has had a positive impact on the development of Asia-Pacific countries in recent years. For example, according to the World Bank Development Indicators (WDI 2007), Asia-Pacific countries have recorded the greatest reduction in poverty since 1981, exceeding the MDG target of reducing poverty by half by 2015. On average, the region has also achieved the MDGs of universal primary education, with a completion rate of 98%, as well as gender equality in terms of access to primary and secondary education. East Asia and the Pacific GDP has grown at an average rate of about 8% per year for the past two decades, the highest among developing regions in 2004. China achieved a growth rate of 10.1%, while Malaysia, Philippines, Thailand, and Vietnam, exceeded 6% growth. Export growth in these countries was particularly strong, ranging from 10 to 28% in 2004 (WDI 2007).

Both theoretical and empirical studies illustrate that FDI inflow contributes to increasing development capabilities in host countries. These inflows provide necessary capital, technology, training and skills that generate substantial tax revenue to host countries (Spore et al. 2006) and enhance their ability to absorb and master technology (Bratels 2005) and innovation (Cheung & Lin 2004). One of the core components of FDI inflow and its impact on highly knowledge-based industries such as ICT is its capability for R&D development at the national level. Amighini (2005) argues that the direct benefits of foreign R&D consist of learning about new technologies and materials, production processes or organizational methods while its indirect benefits derive from the import of goods and services that have been developed by trade partners. Developing countries that have successfully absorbed FDI inflow, particularly in the production of ICT goods and services (e.g., China, India, and Malaysia), have seen a variety of benefits. Specifically, not only have developing countries increased their R&D (OECD 2000, Koski at al. 2000, Keller 2001), boosting their knowledge economy (Cooke 2002) but they have also become important players in the export of ICT products and services (Cheung & Lin 2004) and/or a central location for ICT outsourcing from developed countries (Aubert & Rivard & Patry 1996, Goo & Kishore & Rao 2000, Lee et al. 2003).

While some researchers emphasize the fact that ICTs are facilitating a global shift in the service industries' (Addison & Heshamti 2003) relocation to select developing countries, others are cautious about the contribution of ICT expansion to the economic growth of developing countries (Avgerou 1998,

Gomez & Melesse 1998). ICT products have the advantage of being weightless (Carincross 1997) (software packages, Internet based software downloads, multimedia production, databases and so on) which reduces transport and production costs. These features along with the ability of ICTs to overcome distances and geographical barriers (Quah 2000) provide substantial opportunities for developing countries to attract more FDI inflow in this sector (Aubert & Reiffers 2003, Dowling & Valenzuela 2004, OECD 2004, Graham et al. 2005). For example, several researchers have studied the causality relationship between FDI and ICT expansion and other socio-economic factors (Addison & Heshmati 2003, Chowdhury & Mavrotas 2006, Gholami & Lee & Heshmati 2006, Hansen & Rand 2006) while others did not find strong or statistically significant results related to the ability of ICT expansion to attract FDI inflow (Baliamoune-Lutz 2003). However, a comprehensive study of causality linkage among ICT, FDI and other determinants is beyond the scope of this study.

The intensity of FDI inflow is also suggested as a measure towards globalization (Loungani & Razin 2001), trade liberalization (Santos-Apulino & Thrilwall 2004) and trade openness (Jussawalla 1999, Addsion & Heshmati 2003, Baliamoune-Lutz 2003). For example, through an empirical analysis within the context of developing countries, Addison and Hestmati (2003) found a strong correlation between FDI, GDP growth, trade openness and ICTs. Openness of the economy is argued as the trade share of the GDP (Addision & Heshmati 2003) and it is measured as the ratio of the sum of exports and imports to the GDP in world prices (Baliamoune-Lutz 2003). Amighini (2005) argues theoretical studies explain that a higher aggregate trade volume is assumed to have a positive effect on productivity growth since it encourages innovation and imitation. Baliamoune-Lutz (2003) argues that both exports and imports may stimulate increased adoption and expansion of ICTs. For example, some imported or exported goods and services require the extensive use of ICTs. In the context of oil exporting in Middle East countries, all aspects of oil production from extraction to refinery, discovery of new reserves and transportation are heavily dependent on the use of ICTs to maintain and increase export volume. Amighini (2005) points out that there is empirical evidence to suggest that trade openness enhances productivity gains and industrial progress in technology-intensive industries such as ICTs and that an underdeveloped ICT infrastructure will result in less trade (Stiglitz 1989). Tan (2004) emphasizes that openness and market competition can affect a change in political and economic systems and contribute heavily to modernization of developingsocieties.

Other parameters investigated in this study are related to the growth of the GDP and the level of education of the general population. It is claimed that GDP growth and the increased level of education have a positive impact on the expansion of ICTs in each country. The growth of the GDP enables businesses and agencies within private and public sectors to demand better, faster and smarter ways to conduct business while education is the cornerstone for the use and implementation of knowledge-based tools and services provided by ICTs. Li and Resnick (2003) found a strong correlation between FDI and GDP growth. The level and growth of the GDP is a significant factor in telecommunications expansion as well as in determining the level of foreign direct investment (Reynolds et al. 2004). FDI inflow in host countries will result in the growth of the GDP (Li & Resnick 2003) and companies(?) seeking a base to produce for the domestic market in the host country are attracted to countries in which real income, and therefore domestic purchasing power, is growing (Addison & Heshmati 2003). A 1998 study conducted by Farr et al. supports the mutual relationship between GDP and economic freedom. Their empirical research shows that for both industrial and non-industrial countries, the past level of real per capita GDP is a robust factor that significantly improves the explanation of current economic freedom.

As mentioned, education positively impacts ICT expansion. The use and implementation of ICTs in schools, academic institutes, government agencies in form of e-government (Lenihan 2002, Clift 2004, King 2006) trade and businesses such as e-banking and B2B transactions as well as private use of these

tools and services require a higher level education than was previously required. Education develops and enhances knowledge and skills which will increase the opportunities for firms to invest more in the host countries, specifically in ICTs that are R&D intensive technologies. There is a strong correlation between education and ICT expansion in that quality of the host country's human capital strongly influences FDI inflow (Addison & Mavrotas 2004, Saggi 2002, Norobakhsh et al. 2001, Sadik 2001) and thereby influences the degree of ICT expansion. While education played a crucial role in recent economic development in that Asia-Pacific region, particularly in countries such as China, Korea, Malaysia and Singapore (Knell 2007, Addison and Mavrotas, 2004), in Africa, however, the poor investment in education and training remained the main barrier to private capital flow in the region (Addison and Mavrotas 2003).

2.2 ICT Development in Asia-Pacific vs. Middle East

Table 2.1 shows the level of digital access in Asia-Pacific and the Middle East. There are four levels of digital access as defined by the United Nations ICT Task Force (2005) ranging from High Access to Low Access. While Hong Kong (China), and Singapore ranked as having high digital access, no ME countries hold rank in this category. Four of the developed countries in the Middle East are categorized as upper digital access (Bahrain, Kuwait, Qatar and UAE), while in the Asia Pacific region only Malaysia is located in this category. The remaining (Asia-Pacific and ME) are categorized as medium digital access category while Syria is the only country registered in the low digital access category.

During the last decade, both Asia-Pacific and ME countries experienced an explosive ICT expansion particularly in core ICT components notably due to an increased investment in this area (see Table 2.2). The highest level of growth overall was in mobile cell phone usage which is supplanting the use of land lines in both regions. The most developed countries in Asia-Pacific such as Hong Kong, Malaysia and Singapore saw either no growth or a decline in the main telephone line subscriptions . This phenomenon was mirrored in the Middle East where the most developed countries in the region namely, Kuwait, Qatar and UAE also saw a decline in their main telephone subscribers. Malaysia and UAE are among other developed countries in their respective regions that had the same level of decline in main telephone lines. It is evident that in developed countries, cell phones are replacing the traditional main line telephone services, while in developing countries this service is still very popular (e. g., China, Indonesia, Philippines, Vietnam, Iran, Oman and Syria). During the period of 1996 to 2005, Vietnam had the highest rate of main telephone line expansion, increasing 12.5 fold in the Asia-Pacific region, while in Iran, a 2.8 fold expansion of main telephone line usage was the highest growth in the ME region.

	Digital Access Level			
	High Access	Upper Access	Medium Access	Low Access
Asia-Pacific	Hong Kong	Malaysia	China	
	Singapore		Indonesia	
			Philippines	
			Thailand	
			Vietnam	
Middle East		Bahrain	Iran	Syria
		Kuwait	Jordan	
		Qatar	Oman	
		UAE	Saudi Arabia	

Table 2.1. Source: UN ICT Task Force

Of the Asia-Pacific countries, China had the second highest ICT expansion after Vietnam due to its

massive ICT investment (see Table 2.2). From 1996 to 2004, China's annual telecom investment grew from $91 billion USD to $220 billion USD. The result of this was a telecom revenue of $527.5 billion USD in 2004 compared to $140 billion USD in 1996. China surpassed the United States in the export of ICT goods and services to become the world's largest exporter in this area (ITU 2007a). According to Yin (2005), the reason for this success can be attributed to China's industrialization over the past decade in which the ICT sector supplanted the textile industry which was branded as Chinese longstanding industry. The ICT industry became not only the largest industry in China but also the fastest growing industry that attracted the most foreign investors from across the globe including Sony-Ericsson, Alcatel-Lucent, Nokia and Motorola (ChinaCCM, 2008). As a result of this investment, the productions and services of China's ICT industry tripled from 1995 to 2002. There were three main drivers behind the success of the Chinese IT industry: a) the liberalization of investment and trade freedom which encouraged FDI flow into the ICT sector in China; b) the increased popularity of ICT products and services such as PCs, mobile phones and the Internet in both domestic and corporate environments; c) the size of China's market and population provided an attractive environment for global ICT providers to invest heavily in ICTs produced in China. Yin (2005) also points out that the promotion of digitization by Chinese enterprises created a large market for ICT products and services. These companies began to see ICTs not just as simple tools for storing and processing data but also as an important tool for developing and managing businesses. As a result, it is expected that China's mobile subscribers will increase to 640 million in 2010, compared to the total estimate of 393.5 million subscribers in 2005. While the fixed line subscriber base is expected to grow around 4% for the period of 2006-2009, the Internet broadband subscriber growth is anticipated to increase by 21%. In 2005, the number of Internet users estimated at 111,000,000 was the second largest in the world after the United States.

Country	Main Tel		Cell Phones		PC		Internet	
Asia Pacific	1996	2005	1996	2005	1996	2005	1996	2005
China	4.41	26.63	0.55	29.9	0.36	4.05	0.01	8.6
Hong Kong	53.63	53.94	21.16	123.47	18.65	59.26	4.66	50.08
Indonesia	2.11	5.73	0.28	21.06	0.67	1.36	0.06	7.18
Malaysia	17.81	16.79	7.18	75.17	3.59	19.16	0.85	42.37
Philippines	2.55	4.00	1.37	41.30	1.16	4.46	0.06	5.32
Singapore	42.58	42.39	16.70	100.76	25.89	40.22	8.17	51.84
Thailand	7.05	10.95	3.13	42.98	1.69	5.83	0.23	11.03
Vietnam	1.50	18.81	0.09	11.39	0.27	2.45*	0.00	3.45
Middle East								
Bahrain	23.95	26.90	6.65	58.35	6.60	16.90	0.83	21.33
Iran	9.70	27.30	0.10	10.39	3.30	10.53	0.02	10.07
Jordan	7.78	11.10	0.54	28.93	0.90	5.34	0.05	11.22
Kuwait	20.68	19.00	7.97	88.57	6.60	22.33	0.79	26.05
Oman	8.83	10.32	0.67	51.94	1.10	4.66	0.20	11.10
Qatar	26.40	26.30	5.69	92.15	6.90	17.88	0.99	28.16
Saudi Arabia	9.36	15.50	0.99	54.12	3.80	35.39	0.03	6.62
Syria	8.20	15.25	0.00	15.49	0.89	4.20	0.02	5.78
UAE	29.64	27.49	7.78	100.86	6.40	19.84	0.39	31.08

*Table 2.2. Source: ITU World telecom Indicators 2007, Vietnam * is estimated*

Until 1995, the Hong Kong telecommunication sector was a monopoly. Since the implementation of recommendations provided by Hong Kong's telecommunication regulatory body (OFTA), the country was able to fully liberalize its ICT market in 2001 and maximize an open ICT competition (ITU 2007a). Currently, there are no limits on foreign ownership of the ICT sector and FDI inflow is encouraged by the

internal government. The openness of Hong Kong towards its ICT market and its clear market conditions make the country an attractive place for ICT operators and investors. As a result, Hong Kong had the highest mobile cell phone penetration rate of 123.5% with 859,926 Internet hosts and an Internet penetration rate of 50.08%.

Singapore had the largest growing market for mobile cell phones during the last decade. The country's mobile phone and internet subscribers increased significantly from 1996 to 2005. For example, Singapore's Internet penetration rate increased from 8.17% in year 1996 to 51.84% in 2005 while its main line usage rate decreased slightly. During the last decade, Singapore's ICT investment increased by 150% and its ICT revenue increased by 128% (ITU 2007a). The country fully liberalized its ICT market in 2000 although its mobile cell phone and the Internet markets were opened up several years earlier (Hiong 2006). In 2003, Singapore ICT export accounted for 54.1% of ICT industry revenue bypassing its domestic ICT revenue.

Other Asia-Pacific countries such as Malaysia, Philippines, Thailand and Vietnam have shown tremendous expansion in their ICT core indicators (see Table 2.2). Vietnam is of particular interest for study of ICT development. Despite the fact that Vietnam has weak investment freedom, financial freedom, property rights, and freedom from corruption, the market reform that started with the Mekong Region Programme 1 (MRP1), provided a foundation to adopt open-market economy. Since then, Vietnam has rapidly opened up its market by joining the Association of South East Asian Nations (ASEAN) in 1995 and became a member of the ASEAN Free Trade Area (AFTA).Vietnam decided to encourage foreign investors into its ICT infrastructure. In 2003, approximately 570 companies engaged in ICT development; 354 of them were foreign companies (Quynh 2006). From 1996 to 2005 Vietnam had the fastest growing ICT development in the Asia-Pacific region, particularly in the area of main telephone line and mobile cell phone usage.

In the late 1990s, governments in the ME invested heavily in ICT infrastructure enabling them to renew and expand their ICT infrastructure through the development and implementation of new technologies. According to World Bank statistics (2006a), in 2000, the total telecom investment in the ME was 22.6% of the countries' total revenue. The result of this investment was an increase of more than 1.3 fold in telecom revenue in 2005, led by Qatar and Jordan (World Bank 2006b, ITU 2007b). ICTs played a crucial role in the oil production process. Modern petroleum technologies are eminently information-intensive technologies. Highly advanced ICT technologies are used in this sector, which provide opportunities to improve economic performance at all stages of the oil supply chain from the production of crude oil to refinery and distribution. It also provides possibilities for expanding proven crude oil reserves, improving the rate of crude oil extraction from existing wells, and providing further means to discovering new wells (UNCTAD 2006b).

As it is shown in Table 2.3, ME countries are divided into two main categories. The first category contains countries that rated high on the Human Development Index, ICT infrastructure development index and GDP per capita (Bahrain, Kuwait, Qatar and UAE). These countries were also able to attract more FDI inflow in their countries or had the best FDI outflow performance, whereas other countries such as Iran and Syria deviated from such practices. One of the main factors behind the success of these countries in ICT development is the process of privatization of government owned telecom sectors in the late 1990s in conjunction with social, economic and political reforms. In contrast, less developed countries in this region continued to keep their telecom sector under strict government control and viewed the telecommunications sector as a key element of national military and economic security considered far too important to be left in private hands (Gholami et al. 2004).
Kane (2007) states Israel, Bahrain, and Jordan ranked highest in economic freedom among 17 MENA nations; two other oil-producing countries, Oman and Kuwait are among the top five. Syria, Iran, and

Libya comprise a group of fairly disparate nations united by their lack of economic or political liberalism. From 1995 to 2005, the average telecommunications revenue as a percentage of the GDP increased by 1.3 fold with Qatar and Jordan seeing the greatest increase (World Bank 2006a).

Country	Population (2005)	Life Expectancy (years) 2005	Adult Literacy 2005	GDP(PPP US$)	HDI rank 2004	FDI inflow (MUS$)2005	ICT rank (2005)
Bahrain	726,617	74.5	86.50%	20,758	39	1046	47
Iran	68,251,090	71.1	82.40%	7,525	96	30	105
Jordan	5,411,500	72	91.10%	4,688	86	1532	97
Kuwait	2,535,446	77.5	93.30%	19,384	33	250	57
Oman	2,566,981	74.7	81.40%	5,837	56	715	86
Qatar	812,842	74.1	89.00%	15,259	46	1469	46
Saudi Arabia	23,118,990	72.6	82.90%	19,844	76	4628	80
Syria	19,043,380	73.8	80.80%	13,825	106	500	110
UAE	4,533,145	79.1	88.70%	3,610	49	12000	45

Table 2.3. Demographic Data:

Source: Land Area, Population, Life Expectancy & Adult Literacy from World Bank (2006); GDPP and HDI rank are from UNDP- Human Development Report 2006; FDI inflow is from UNCTAD-World Investment Report (2006); ICT rank is ITU's Networks evaluation index from ITU - Measuring the Information Society (2007)

While some of the most developed countries in the Middle East in terms of ICT reaped the benefits of a very high level of ICT standards in their countries, Syria had the least rate of ICT development. In addition, these countries were not only actively investing in their ICT infrastructure, they were also becoming specialized ICT providers in various ways. For instance, the annual business reports from leading telecom providers in the region show encouraging results. Zain (formerly MTC), a Kuwaiti based telecom provider in the region, operates in seven Middle East countries and 14 sub-Saharan countries in Africa (Zain, n.d.), t. Zain's consolidated revenues reached a new milestone of Kuwaiti Dinar KD 1.21 billion (USD $4.167 billion) for 2006, an increase of 109% from the previous year.

Other providers such as Qtel (Qatar Telecom) reported similar progress after extending telecom operations into other countries in the region (Qtel n.d.). Qtel recently acquired 51% of Wataniya, the second licensed GSM mobile operator in Kuwait in a deal worth $3.7 billion USD (ITU 2007). Qtel also expanded operations and ICT investments in Bahrain, Oman, Kuwait and Turkey as well as into Pakistan, Singapore and the USA. In addition, the Qatari news network "Al-Jazeera" becomes the most known and controversial television broadcaster in the Arab world. Alterman (2005) points out that the website provided by Al-Jazeera generates more than one million hits per day. Finally, Batelco, the Bahraini telecom operator, reported immense progress in its cable and mobile operations in Bahrain and several key areas of the region including Kuwait, Jordan, and Egypt.

This success in telecom investment indicates an increase in the capacity of R&D knowledge-based service in these countries to not only provide for their targeted region, but also enough to expand their operations across the globe. UAE based telecom Etisalat's recent acquisition of management control of Pakistan's telecom service (PTCL) with an investment of 2.6 billion USD (Ali 2006) in addition to its already established operation in 14 MENA countries is an example of ICT expansion beyond its initial intent of being a regional telecom provider.

2.3 Foreign Direct Investment Inflow in Asia Pacific vs. Middle East

During the period of 1990 to 2000, Asia Pacific countries cited in this study accounted for 49.9% of total FDI inflow in developing countries, while ME countries accounted for only 10%. In 2005, FDI inflow in Asia-Pacific countries reduced in 2005 to 46.5% and increased slightly to 10.51% in ME countries. On the other hand, during the period of 1990-2000, the FDI outflow in the Asia Pacific region was 1.1 fold higher than the total outflow for developing countries and this value increased 1.39 fold in 2005. The FDI outflow in the ME 1990-2000 was 9% of total FDI outflow accounted for in developing countries while this value increased to 10.5% in 2005 (see Table 2.4). In regards to China's export success Graham and Wada (2001) point out that most of the Chinese export expansion is the result of foreign-invested enterprises and recommend that China seek the help of multinational corporations in order to acquire the necessary capital, technology and management skills. In contrast, China's large market, strong infrastructure, low cost labor and the government's open door economic policy are important factors for attracting foreign investors into China (Tan 2004).

FDI	1990-2000	2005
Developing FDI inflows	130,722	314,316
Developing FDI Outflow	52,836	115,860
Asia Pacific FDI Inflow	65,227	146,162
Asia Pacific FDI Outflow	30,038	111,484
ME FDI Inflow	1,318	28,740
ME FDI Outflow	4,932	12,177
China FDI Inflow	30,104	72,406
China FDI Outflow	2,195	12,261

Table 2.4. FDI inflow & Outflow, Source: UNTCAD

Table 2.5 categorizes countries in the Asia Pacific and Middle East regions as determined by UNCTAD's World Investment Report (2006). This report divides countries in four main categories:
a) Front-runners: countries with high FDI potential and performance
b) Above potential: countries with low FDI potential but strong FDI performance
c) Below potential: countries with high FDI potential but low FDI performance
d) Under-performers: countries with both low FDI potential and performance
As Table 2.5 indicates, only countries in the Middle East are categorized as countries that have high FDI potential but low performance. Similarly, Indonesia in the Asia Pacific region and Syria in the Middle East are categorized as under performing in both FDI potential and performance.

FDI inflow	Countries
Front-runners	Bahrain, China, Hong Kong, Jordan, Qatar, Singapore, UAE
Above potential	Vietnam
Below potential	Iran, Kuwait, Oman, Saudi Arabia
Under-performance	Indonesia, Syrian

Table 2.5. FDI performance, Source: UNTCAD

Those Middle Eastern countries that were able to liberalize their economy and create a positive environment for FDI inflow not only attracted the most FDI into the region but were also able to actively participate as FDI investors within and outside of the region (Africa in particular). According to the LocoMonitor's recent report, from 2002 to the beginning of 2007, by number of projects, the UAE was

the largest contributor of FDI in the Islamic world (Chowdhry 2007).

Recent FDI outflow in the telecom sector from some oil exporting countries such as (Kuwait, Qatar and UAE) is argued to be an indication of their desire and efforts to bypass the "Dutch disease", a theory that indicates that natural resource wealth can inhibit the development of other sectors by skewing wages (Kane 2007) and raising the exchange rate, making the non-oil exports less competitive (Ebrahim-Zadeh, 2003). The ICT market expansion for some of the key players in the region such as UAE'-based Etisalat, Kuwaiti-based Zain, and Qatari-based Qtel are successful examples of such activity. This success was largely due to the privatization of the government owned telecom sector and trade liberalization transitioned within the late 1990s and early 2000s. For example, in March 2001, Kuwait's national assembly passed the "Foreign Direct Investment Act," which aimed at promoting foreign investment. The Act facilitated foreign investment processes, reduced restrictions on foreign banks which provided long-term protection to foreign investors against nationalization or confiscation, and eliminated the requirement for foreign companies to have a Kuwaiti sponsor or partner (EIA 2007).

According to the UNCTAD's World Investment Report (2007), the Middle Eastern countries Bahrain, Kuwait, and Qatar had the highest FDI outflow index among 123 economies in 2005 while in Asia-Pacific, Hong Kong, Singapore, Malaysia, and Indonesia had the highest performance (see Table 2.6). This indicates that in the Middle East, only the oil rich countries such as Bahrain, UAE and Qatar had the best performance in both FDI inflow and outflow, whereas Kuwait had its best performance in FDI outflow but had poorer performance in FDI inflow.

FDI Outward Raking			Rank	Middle East	Index
Rank	Asia Pacific	Index	10	Bahrain	3.574
2	Hong Kong	10.147	11	Kuwait	3.168
13	Singapore	2.808	25	UAE	0.938
22	Malaysia	1.281	48	Qatar	0.336
41	Indonesia	0.507	53	Oman	0.309
58	China	0.247	64	Saudi	0.134
65	Philippines	0.133	72	Syrian	0.094
69	Thailand	0.12	76	Iran	0.068
84	Vietnam	0.039	109	Jordan	0.000

Table 2.6. Source: UNCTAD World investment report (2007)

3 RESEARCH APPROACH

This study investigates the impact of FDI inflow, trade openness, GDP, education and governmental intervention in economic activities on the expansion of ICTs in Asia-Pacific and Middle Eastern countries for the period of 1996 to 2005. The research is motivated to answer three questions a) what is the main impetus behind the success of Asia-Pacific countries in attracting FDI inflow into their ICT development? b) what is the impact of FDI inflow and trade openness on ICT expansion? c) what is the impact of regional conflict on ICT development? At the centre of the model is the dependent variable ICT expansion (logict). The intention of this model is to investigate how changes in the independent variables FDI inflow (logfdi), trade openness (logopen), the growth of GPD (loggdp), education (logedu) and governmental intervention in economic activities (loggov) correlate with changes in ICT.

This study does not investigate the causality linkage among variables, nor does it include other parameters that may impact the increase or decrease of FDI inflow into host countries (e.g, paved roads, transportation infrastructure, socio-political climate, institutional democracy, economic freedom and so on) as it is beyond the scope of this study. However, the study investigates issues such as multicollinearity and heteroskedasticity to ensure consistency in the regression analysis as described in section 3.2.

3.1 Data Collection

Panel data was collected as follows: the ICT data composed of main telephone per 100 inhabitants, waiting lines per mainlines, digital lines per mainlines, cell phones per 100 inhabitants, cable TV subscriptions per 100 households, internet hosts per 1,000 inhabitants, secure servers per Internet hosts and International bandwidth (Kbs per inhabitant) was collected from ITU. In constructing the openness, GDPP and education indexes, data from sources such as UNCTAD (2008) and The World Bank (2007) was collected. To increase emphasis on higher education and its impact on ICT expansion and development the formula used by ITU (2007) (education = (primary+ 2*secondary + 3* tertiary)/6) was applied. To measure governments' intervention in business activities the score provided by Heritage Foundation (Miles et al., 2006) was used. Government Intervention Index by HF is comprised of variables such as: government consumption as a percentage of the economy, government ownership of businesses and industries, share of government revenues from state owned enterprises and government ownership of property and economic output produced by the government. A score of one indicates the least amount of intervention and a score five indicates the highest intervention.

3.2 Analytical Methods

Following the literature review, the regression model shown in equation (3.1) was constructed:

$$\log ict_i = \alpha_0 + \alpha_1.\log fdi_i + \alpha_2.\log open_i + \alpha_3.\log edu_i + \alpha_4.\log gdp_i + \alpha_5.\log gov_i + \varepsilon_i \quad (3.1)$$

where α_0 is a constant, α_1 through α_5 are variable coefficients and ε_i is the model's non-constant error.

The model testing was conducted by identifying the linear relationship between independent variables and dependent variables (see Appendix A). After the model was tested, two issues related to linear regressions were tested namely multicollineratity and heteroskedasticity. Multicollinearity is a problem linked to independent variables that are highly correlated with each other and may cause a wide swing in the parameters estimate due to small changes in data. To test the multicollinearity issue (Gujarati 2003) the Variance Inflation Factor (VIF) was estimated. The study's test shows a VIF value of 2.23 which is a value far from VIF's critical values of 10 (moderate multicollinearity) and/or 30 (sever multicollinearity). In addition, the study did not find a partial correlation among independent variables (see Appendix A). Another issue that was addressed was related to the outliners. Extreme points may influence the result of regression. To test outliners, Cook's distance on panel data was analyzed. Cook's distance of *i*th observation D_i deserves further investigation if $D_i > n/4$ where *n* is the number of observation (Bollen and Jackman 1990). The model was setup to make sure that in case of heteroskedastic errors, the errors are eliminated using White's correction for heteroskedasicity (White 1980). If a model suffers from a severe heteroscedasticity it may bias standard errors and *p*-values (too large or too small).

To address the above issues this study applies a cluster robust regression method in place of the conventional linear regression. The conventional linear regression model uses the estimator of variance: $y_i = x_i\beta + \varepsilon_i$ where (x_i, ε_i) are independent variables and random disturbances independently and identically distributed with variance ∂^2. However, a clustered robust regression is based on the estimator of cluster variance (Rogers 1993). This offers the possibility to relax the assumption of independence of

observed data, and to "correct" standard errors (in measurement sense) even if the observations are correlated. The goal of robust statistical regression procedures is to reduce the amount of iteration needed to obtain a working model, and filter out heteroskedastic problems. In addition, while the traditional regression analysis can often lead to an inaccurate final model, if there is misspecification, or if outliners are present. The robust regression analysis, however, is designed to perform well when the shape of the true underlying model deviates slightly from the assumed parametric model (e.g. if outliers are present), (Olive 2006). The cluster option was selected in order to sort the 17 economies into two different geographical regions.

To analyze the impact of regional conflict on FDI inflow and thereby ICT expansion, using STATA software, the Mixed-effects Maximum Likelihood (ML) regression method on equation (3.1) was applied. This method contains both fixed and random deviation effects allowing random deviations other than those associated with overall error term. The usage of ML estimation (Gould & Pitbtldo & Srinbey 2003) ensures that the regression method can handle problems that may occur during multiple stages of clustering (e.g. converge problems such as standard error calculation, infinite iteration, model instability and missing values).

4 DATA ANAYISIS

Table 4.1 shows the result of robust linear regression on panel data. As it indicates variables such as trade openness, Education and GDP have positive impact on ICT expansion. The coefficients of these variables are positive and their *p*-values indicate that the results are statistically significant at 95%. The result is consistent with the results from earlier researches in this area (Addison & Heshmati 2003, Gholami & Lee & Heshmati 2006). In addition, the result shows that governmental intervention in economic activities imposes negative influence on ICT expansion.

logict	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logfdi	-0.1037077	0.0592208	-1.75	0.082	-.2206413	.0132259
logopen	0.156735	0.0531346	2.95	0.004	.0518189	.2616510
logedu	0.4045043	0.0678548	5.96	0.000	.2705227	.5384859
loggdp	0.3564846	0.0975478	3.65	0.000	.1638730	.5490961
loggov	-0.1517383	0.0522439	-2.9	0.004	-.2548957	-.0485809
_cons	-4.493493	1.136203	-3.95	0.000	-6.736965	-2.250022

Table 4.1. Robust linear regression on panel data, significant at 0.05 level.

The coefficient of variable loggov and its *t*-value show a negative sign and its *p*-value affirms that the result is statistically significant. However, the FDI impact on ICT expansion deserves further investigation, as depicted in table 4.1, the *p*-value indicates a significant at 90% level and both *t*-value and FDI's coefficient value show a negative sign. In order to investigate the problem and also obtain more accurate data from each region the cluster robust regression was applied on panel data. Data obtained from tables 4.2 and 4.3 indicates that the main reasons for the above values are the impact of Middle East's FDI inflow on panel data as described below.

1) FDI inflow has a positive impact on ICT expansion in Asia Pacific economies (table 4.3) with a statistically significant impact of 95% confidence, but not on the Middle Eastern countries. FDI inflow impact on ICT expansion in Middle East is not statistically significant even though its coefficient value shows a positive signs.

2) Trade openness (logopen) in Asia Pacific and Middle Eastern countries is the ultimate result of economic reforms in the majority of countries (except for Iran and Syria) during the period of 1996 to

2005. Both regions show a positive impact of trade openness on ICT expansion. However, the variable *t*-value in Asia Pacific along with its coefficient show higher values than the corresponding values for the Middle East indicating stronger trade openness impact on ICT expansion in the Asia Pacific region.

logict	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logfdi	0.0297185	0.0746095	0.4	0.691	-.1186507	.1780877
logopen	0.7375784	0.1575791	4.68	0.000	.4242151	1.050942
logedu	0.1800419	0.0734493	2.45	0.016	.0339799	.3261039
loggdp	0.2906563	0.0991033	2.93	0.004	.0935785	.4877342
loggov	-0.0454741	0.0234288	-1.94	0.056	-.0920649	.0011168
_cons	-2.520579	1.164339	-2.16	0.033	-4.835995	-.2051643

Table 4.2. Cluster robust linear regression: Middle East, significant at 0.05 level

3) Education and the growth of GDP have positive impacts on ICT expansion in both Asia Pacific and Middle Eastern countries with stronger impact on Asia-Pacific countries than Middle Eastern countries.
4) Government intervention in economic activities imposes negative influence on both Asia Pacific and Middle Eastern countries. While this impact is strongly significant on Asia-Pacific countries, however it is significant at 90% for Middle Eastern countries. According to the World Bank (2006b) private sector competition remains the driving force in extending telecommunications access to billions of people around the world and firms tend to invest more in infrastructure (Grover et al. 1998) in a more competitive environment. Government intervention in economic activities is considered as a main barrier to economic freedom (Gwartney et al. 2006, Miles et al. 2006), where intervention can obstruct business activities and impose political, judicial, and administrative corruption.

logict	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logfdi	0.2148773	0.088268	2.43	0.017	.0389995	.3907551
logopen	0.6035676	0.0658971	9.16	0.000	.4722649	.7348704
logedu	0.7260627	0.1306236	5.56	0.000	.4657894	.986336
loggdp	0.6219411	0.1573434	3.95	0.000	.3084276	.9354546
loggov	-1.004435	0.3238769	-3.1	0.003	-1.649774	-.3590959
_cons	-5.890174	2.847681	-2.07	0.042	-11.5643	-.2160456

Table 4.3. Cluster robust linear regression: Asia-Pacific, significant at 0.05 level

In the context of this study, in order to analyze the effect of regional conflict on panel data, a dummy variable (conflict) was constructed by assigning Iran and Syria a value of 1 (involvement in the regional conflicts) and 0 otherwise.

Peace and regional stability are preconditions for attracting FDI investors. Buzan et al (1991) emphasize that insecurity arises when there is a military, economic, political, societal and/or environmental threat. According to the UN ICT Task Force (2005), ICTs are crucial tools in helping to address the root causes of violent conflict. Promoting access to knowledge contributes to the growth of mutual understanding, an essential factor in conflict prevention and post-conflict reconciliation. Any regional conflict or war can impair or destroy much of the ICT infrastructure of countries involved in the conflict.

During the last two and a half decades, the Middle East was witness to major conflicts that imposed a devastating impact on social, economic and political development. These include: the conflict between Syria and Israel on one hand and Lebanon and Israel on the other, a 15-year civil war in Lebanon (1976-1991), the involvement of Syria in Lebanon's internal affairs, the eight year bloody war between Iran and Iraq (1980-88), and the subsequent invasion of Kuwait by Iraqi troops (1990-1991) which resulted in the

Persian Gulf War (1991) and the invasion of Iraq by coalition forces (March 2003), and the Israeli and Lebanese war (2006) are among the conflicts that destroyed much of the infrastructure in affected countries.

The mixed-effects maximum likelihood regression was applied on panel data. Table 4.4 shows the result of regional conflict on ICT expansion in Middle East. As the table indicates the regional conflict imposes a negative influence on FDI inflow, since instability caused by regional conflict will discourage FDI investors not only from investing in host countries directly involved in the conflict but this lack of investment will negatively impact the entire region as a whole. This conflict has also a strong negative impact on other variables particularly on trade openness and GDP.

logict	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logfdi	-0.0502333	0.0554165	-0.91	0.365	.0389995	.3907551
logopen	0.6292529	0.1117229	5.63	0.000	.41028	.8482258
logedu	0.1450679	0.042294	3.43	0.001	.0621732	.2279626
loggdp	0.1635528	0.0672182	2.43	0.015	.0318076	.2952979
loggov	-0.0999186	0.0304469	-3.28	0.001	-.1595934	-.0402438
_cons	-1.195937	0.6920975	-1.73	0.084	-2.552423	.1605493

Table 4.4. Mixed-effects Maximum Likelihood regression on ME data, significant at 0.05 level

Unexpectedly, the regional conflict in the Middle East had an inverse impact on FDI inflow and trade openness in Asia-Pacific region. These values increased slightly from 0.21 (logfdi) and 0.60 (logopen) to 0.24 and 0.63 respectively. Investigating such an impact can lead to further research in this area. One can consider this impact (regional conflict in Middle East) as the possibility of capital outflow from the region and its investment in a more stable and safe region (Asia-Pacific); and the negative influence that this type of impact may cause for FDI investors to look for a more stable region to avoid investing in the conflict zones. This may also be an alarm signal for policy makers in the Middle East.

5 LIMITATIONS AND CONCLUSION

This research has some limitations resulting from the choice of methodology and the data that were analyzed. Because the paper was interested in investigating the general impact of FDI inflow on the expansion of ICT, the research focused on macro level data and did not account for or investigate micro level data. As such, it did not examine any case studies of individual countries to understand the nature of the FDI inflow and responses to it. Additional research such as field studies is needed to investigate the micro level in order to understand how specific FDI inflow and parameters such as trade openness influence ICT expression.

Currently, a number of developing countries such as China, Hong Kong, Singapore, Malaysia, the Philippines, and Thailand have emerged as ICT suppliers and exporters at the global level. The main impetus for the Asia Pacific countries' ICT expansion during the period of 1996 to 2005 was rapid economic reform in the mid of 1990s that affected the entire region. This reform imposed drastic changes in the course of new policies that encouraged FDI inflow into their countries particularly in China and Vietnam. Tan (2004) points out that the current political environment favors the free flow of technology between China and other nations and the course of changes in China lead to the loosening of previous restrictions on technology import and export behavior which resulted in abandonment of the ideological belief in nationalism and self-reliance among the Chinese as far as technology is concerned. Li (2006) emphasized, in regard to China's telecom success, that the Chinese government and telecom

manufacturers adopted a three-stage priority plan: 1) importing and transferring; 2) digesting and absorbing and 3) growing and exporting. This was possible since a concerted effort was made to respond to global business demands to be competitive in the telecom equipment sector along with personnel changes in top leadership, recruitment of young experienced professional managers and recruitment of returnee nationals. Tan and Leewongcharoen (2005) argue that Thailand's success in becoming one of the world leaders in IT hardware exports is related to FDI inflow into the country. FDI provided the technological, capital and skilled human resources to Thailand's IT industry. These factors combined with government policies for encouraging FDI inflow were the main drivers behind this success.

Despite the enormous success of ICT expansion in both regions during the period of 1996 and 2005, the digital divide between the most ICT-developed countries and the least ICT-developed nations in each region increased by 2.47 fold in Asia Pacific and 4.5 fold in the Middle East. In particular, the digital divide increased in two main ICT areas: mobile cell phones and the Internet (see Table 2).

The empirical analysis of this study indicates that the delay in ICT expansion in Middle Eastern countries are threefold: the level of FDI inflow; governmental intervention on business activities and regional conflicts.

The existing level of FDI inflow in the region is low in comparison to other regions and particularly in East Asia. Government intervention in business activities that dominate most of the resources and its direct use of scarce resources for its own purposes as well as governmental control over resources through ownership deters investors in becoming more involved in business activities. For instance, in the area of ICT development, those countries that successfully implemented partial privatization of their telecom sector were able to increase their operations in both local and regional markets. On the other hand, those countries that imposed firm governmental control over their ICT development were not able to develop their ICT infrastructure at the same pace and hence increased their existing digital divide in the region. For example, according to ITU data (2007), the digital divide between Qatar on one hand and Iran and Syria on the other increased by 1.07 fold during the period of 2001 and 2005. The study results of Iran and Bahrain also provide support for this empirical result.

Bahrain was able to implement the most advanced economies in the Persian Gulf (Beach & Miles, 2006). It maintains a business friendly environment with an excellent banking and finance system, low regulation, and low barriers to foreign investment.

Even though Iran should be a highly attractive market for a range of foreign firms given its extensive, underdeveloped natural resources and young and increasingly educated population, it was not able to attract FDI inflow, due to strict governmental control of economic resources, political instability and the current UN sanctions against Iran. These factors create an unfavorable environment for FDI inflow. The inflow into non-hydrocarbons projects showed a disappointing $50 million USD a year according to UNTCAD (2006b) data, the equivalent of less than 0.01% of GDP (EDC, 2007). Where socio-political amity and stability are preconditions for attracting FDI investors, regional conflict increases insecurity among investors and poses negative influence on other components important to FDI inflow such as ICTs.

The results of this study also indicate that the variables used ultimately have socio-economic implications. Their interdependence has a negative and positive impact on influencing the appeal of business attraction, as peace and regional stability are preconditions for attracting FDI investors. Openness, education and governmental noninterference are integral in ensuring an environment for attracting FDI and in turn the expansion of ICTs. The increase and expansion of the global marketplace, Internet economy, changing business ecosystems and pressure for accountability and transparency, places a demand on the capability

of governments to provide supporting infrastructures to increase FDI and expand ICT systems.

References

Addison T., Mavrotas, G. (2003). Infrastructure and Development in Africa, in TICAD III, Gaps, Key-Issues and Challenges. United Nations University's Policy Brief, United Nations Center, Tokyo.

Addison T., Mavrotas, G. (2004). Foreign Direct Investment Innovative Source of Development Finance and Domestic Resource Mobilization. Global Economic Agenda, Helsinki Process on Globalization and Democracy. UNU-WIDER, Helsinki, Finland.

Ali, M. (2006). Monthly IT & Telecom Magazine, Eyeing to be in the top 10 telecom companies, Retrieved from: http://www.itinsight.info/etisalat_aiming_to_buy_wataniya_mobile_operator.htm

Alterman, J. B. (2005). IT comes of age in the Middle East: Focus on IT and diplomacy, Foreign Service Journal, December.

Amighini, A. (2005). China in the international fragmentation of production: Evidence from the ICT industry. The European Journal of Comparative Economics, 2(2), 203-219

Aubert, B. A., Rivard, S., Patry, M. (1996). A transaction cost approach to outsourcing behavior: some empirical evidence. Information & Management 30(2), 51-64.

Aubert, J. and Reiffers, J. (2003). Knowledge Economies in the Middle East and North Africa: Toward New Development Strategies, World Bank Publications.

Avgerou, C.(1998). How can IT enable economic growth in developing countries?. Information Technology for Development, 8, 15-28.

Baliamoune-Lutz, M. (2003). An analysis of the determinants and effects of ICT diffusion in developing countries. Information Technology for Development, 10(3), 151-169.

Berggren, N. (2003). The benefits of economic freedom: A survey. The Independent Review, 8(2), 193–211.

Buzan,B., Kelstrup, M., Lemaitre ,P., Tromer, E., Waever, O.(1991).The European Security Order Recast: Scenarios for the post-Cold War Era, International Affairs (Royal Institute of International Affairs 1944-),67(4),p. 774

Cairncross F. (1997). The Death of Distance. Harvard Business School Press, Cambridge.

Cheung, K.y., Lin, P. (2004). Spillover effects of FDI on innovation in China: Evidence from the provincial data. China Economic Review 15, 25-44.

Chowdhry, S. (2007).Foreign Direct Investment (FDI) on the Rise in OIC Economies, Retrieved from: http://www.dinarstandard.com/current/OIC_FDI040907.htm

Chowdhury, A. and Mavrotas, G. (2006). FDI and Growth: What Causes What?. The World Economy, 29(1), 9-19.

Clift, S. (2004). E-Government and democracy: Representation and citizen engagement in the Information Age. United Nations. http://www.publicus.net/articles/cliftegovdemocracy.pdf. Accessed 12 May 2007.

Cooke P. (2002). Knowledge Economies: Clusters, Learning and Cooperative Advantage. Routledge, London.

Delasnerie, S.(2007). View from Middle East & Africa, fDimagazine.com, p 69, October 03, 2007. Retrieved from: http://www.fdimagazine.com/news/fullstory.php/aid/2179/View_from_the_Middle_East___Africa.hl

De Haan, J. & J-E. Sturm. (2000). On the relationship between economic freedom and economic growth. European Journal of Political Economy, 16, 215–41.

Dowling ,J. M., Valenzuela, M. R. (2004). Economic Development in Asia, Cengage Learning Asia.

Ebrahim-Zadeh, C. (2003). Dutch Disease: Too much wealth managed unwisely, A Quarterly magazine of ITMF, 40(1), March 2003.
EDC(2007). Export Development Canada, Global Export Forecast Spring 2007
EIA (2007). Country Analysis Brief, Middle East, Persian Gulf Region, Retrieved from: http://www.eia.doe.gov/emeu/cabs/Persian_Gulf/Background.html
also: http://www.eia.doe.gov/emeu/cabs/Kuwait/Background.html
Etisalat, Financial Information (n.d.). 2005 and 2006 Annual Reports, Retrieved from: http://www.etisalat.ae/index.jsp?lang=en&type=finrep&currentid=19b3ef5dc1b42110VgnVCM10000024a8c0____&parentid=249def484523a010VgnVCM1000000a0a0a0a____
Export Development Canada (EDC), Global Export Forecast Spring 2007
Farr, W.K., Lord, R.A. and Wolfenbarger, J.L. (1998). Economic freedom, political freedom, and economic well-being: A causality analysis. Cato Journal, 18 (2), 247-62
Freedom House (2006). Map of Freedom in the World, Retrieved from: http://www.freedomhouse.org/template.cfm?page=363&year=2006.
Gholami, R., Lee, S. T. and Heshmati, A. (2006) The Causal Relationship Between Information and Communication Technology and Foreign Direct Investment. The World Economy, 29 (1), 43–62.
Gholami, R., Moshiri, S. and Lee, S. (2004). ICT and productivity of the manufacturing industries in Iran. The Electronic Journal of Information Systems in Developing Countries, 19(4), 14.
Gomez, M.D. and Melesse, M.(1998). Utilizing information and communication technologies for development: the social dimensions. Information Technology for Development, 8, 3–13.
Goo, J., Kishore, R., Rao, H.(2000). A content-analytic longitudinal study of the
drivers for information technology and systems sourcing. Proceedings of the
21st International Conference on Information Systems, Brisbane, Queensland,
Australia, December 10-13, 601-11.
Graham, M. E., Oding, N. and Welfens, P. (2005). Internationalization and Economic Policy Reforms in Transition Countries, Birkhäuser.
Gould, W., Pitbtldo, J. and Srinbey, W. (2003). Maximize Likelihood Estimation with Stata. 2nd Edition. TX: Stata press.
Graham, M. E. and Wada, E. (2001). Foreign Direct Investment in China: Effects on Growth and
Economic Performance, Peterson Institute Working Paper Series WP01-3, Peterson Institute for
International Economics.
Grover, V., & Vaswani, P. (2000). Partnerships in the US Telecommunications Industry, Communication of ACM 43(2), 81-89.
Guillen, M.F, Suarez, S. (2005). Explaining the global Digital Divide: Economic, political and sociological drivers of cross-national Internet use. Social Forces, 84(2), 681-708.
Gwartney, J. & Lawson, R. (2006). Economic freedom of the world 2006 Annual Report, The Fraser Institute.
Hansen, H. and Rand, J. (2006).On the Causal Links Between FDI and Growth in Developing Countries. The World Economy, 29(1),21-41.
Hiong, G. (2006). Digital Review of Asia Pacific 2005/2006: Singapore, Retrieved from: http://www.digital-review.org/.
Hwang, J. (2006). Digital Review of Asia Pacific 2005/2006: Korea, Retrieved from: http://www.digital-review.org/.
ITU (1997). World Telecommunication Development Report 1996/97, Trade in Telecommunications, Geneva: ITU.
see also World Telecommunication Development Report 2003, Access indicator for the Information Society
ITU (2001). Arab States Telecommunication Indicators 1992-2001. Retrieved from: http://www.itu.int/ITU-D/ict/statistics/at_glance/ARTI02_E.pdf

ITU news magazine. (2007). ICT in Qatar, Retrieved from: http://www.itu.int/itunews/manager/display.asp?lang=en&year=2006&issue=02&ipage=ICTinQatar&ext=html

ITU Regulatory Newslog. (2007). Qtel agrees to acquire control of Wataniya telecom, March 05, 2007. Retrieved from: http://www.itu.int/ituweblogs/treg/Qtel+Agrees+To+Acquire+Control+Of+Wataniya+Telecom.aspx

ITU (2007a). The Future of Voice, Communications: Government and Business Practices in the Asia Pacific Region.

ITU (2007b). Measuring the Information Society 2007, ICT Opportunity Index and World Telecommunication/ICT indicators.

Jensen, N. (2003. Democratic Governance and Multinational Corporations: The Political Economy of Foreign Direct Investment. International Organization 57,587-616.

Jensen, N. (2006). Nation-States and the Multinational Corporation: Political Economy of Foreign Direct Investment. Princeton and Oxford: Princeton University Press.

Jussawalla, M.(1999). The Impact of IT convergence on development in the Asia- Pacific region. Telecommunications Policy, 23, 217–234.

Kane, T. (2007). Economic Freedom in Five Regions, In Kane, T., Holmes, K.R. and O'Grady A. M. (eds.), 2007 Index of Economic Freedom, Washington, D.C.: The Heritage Foundation and Dow Jones & Company, Inc., Retrieved from: www.heritage.org/index

Keller W. (2001). The Geography and Channels of Diffusion at the World's Technology Frontier. NBER Working Paper No. 8150.

King, J. (2006). Democracy in the Information Age. Australian Journal of Public Administration 65(2), 16–32.

Koski H., Rouvinen P., Ylä-Anttila P. (2000). ICT Clusters in Europe: the Great Central Banana and the Small Nordic Potato. The Research December Institute of the Finnish Economy.

Kraemer, K.L., and Dedrick, J. (1993). National technology policy and the development of information and organizations. Irvine, CA: University of California, Center for Research on Information Technology and Organizations.

Krogstrup, S. and Matar, L. (2005). Foreign Direct Investment, Absorptive Capacity and Growth in the Arab World, HEI Working Paper No. 2. Retrieved from: http://hei.unige.ch/sections/ec/pdfs/Working_papers/HEIWP02-2005.pdf

Lee, J. N., Huynh, M. Q., Kwok, R. C. W. and Pi, S. M.(2003). IT Outsourcing Evolution. Past, Present, and Future, Communications of the ACM, 46(5), 84-89.

Lenihan, D. (2002). Realigning Governance: From E-Government To E-Democracy. OECD E-government project Seminar: Vision, Responsiveness and Measurement, Paris.

Li, C. (2006). China's Telecom Industry on the Move: Domestic Competition, Global Ambition, and Leadership Transition, China Leadership Monitor No. 19.

Li, Q. (2005). Democracy, Autocracy, and Expropriation of Foreign Direct Investment, Political Economy of MNE, St. Louis, June 2005.

Li, Q. and Resnick, A. (2003). Reversal of Fortunes: Democracy, Property Rights and Foreign Direct Investment Inflows in Developing Countries. International Organization 57, 175-214.

Knell, M. (2007). Uneven Technological Accumulation and Growth in Least Development Countries, UNCTAD: The Least Development Countries report 2007, Background paper No. 11.

Loungani, P. and Razin, A. (2001). How Beneficial Is Foreign Direct Investment for Developing Countries? Finance and Development Quarterly, 38(2), 6-10.

Maigna, J. C., Ottaviano, I. P. G. and Pinelli, D.(2003). ICT, Clusters and Regional Cohesion: A Summary of Theoretical and Empirical Research. FEEM Working Paper No. 58.2003.

Miles, M.A, Holmes, K. R. & Anastasia, M.A. (2006), 2006 Index of Economic Freedom, The Heritage Foundation and Wall Street Journal.

Noorbakhsh, F., Poloni, A. and Youssef, A. (2001). Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence. World Development, 29(9), 1593-610.
North, D. C. and Weingast, B. R. (1989). Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England. Journal of Economic History 49, 803-832.
OECD (2002), Measuring the Information Economy. OECD, Paris.
OECD (2004). Caribbean Rim: Costa Rica, Dominican Republic and Jamaica, OECD Publishing.
Olive, D. (2006). Applied Robust Statistics, Southern Illinois University.
Olson, M. (1993). Dictatorship, Democracy, and Development. American Political Science Review 87, 567-576.
Parente, S. and Prescott, E. (1994). Barriers to Technology Adoption and Development, Journal of Political Economy, Vol. 102, 298-318.
Pinherio, J. & M. Bates. (2000). Mixed-Effect Models in S and S-PLUS, New York: Springer.
Raudenbush W. & A. Bryk. (2002). Hierarchical Linear Models: Applications and Data Analysis Method, 2nd edition Thousand Oaks, CA: Sage.
Reynolds, T.,Kenny,C.,Liu, J. and Qiang, C. (2004). Networking for foreign direct investment: the telecommunications industry and its effect on investment, Information Economics and Policy, 16(2), 159-164.
Rogers, W. H. (1993). Regression standard errors in clustered samples, Stata Technical Bulletin 53, 32-35.
Qtel (n.d.). Partnerships and Alliance, Retrieved from: http://www.qtel.com.qa/Partnership.do
Quah D. (2000). The weightless economy: In whose interest?. CEP's Centre Piece, 5(1), 28-30.
Quynh, N. (2006). Digital Review of Asia Pacific 2005/2006: Vietnam, Retrieved from: http://www.digital-review.org/.
Saggi, K. (2002). Trade, Foreign Direct Investment, and International Technology Transfer: A Survey. World Bank Research Observer, 17(2), 191-235.
Santos-Paulino, A. and Thirlwall,A.P.(2004). The impact of trade liberalisation on exports, imports and the balance of payments of developing countries, The Economic Journal 114(493),F50–F72.
Santos-Paulino A.,Thirlwall A.P.(2004).Trade Liberalisation And Economic Performance In Developing Countries - Introduction, The Economic Journal,114
Sadik, A. and Bolbol, A. (2001). Capital Flows, FDI, and Technology Spillovers: Evidence from Arab Countries, World Development, 29 (12), 2111-2125.
Sarbib, J-L.(2002). Building knowledge societies in the Middle East and North Africa, Knowledge for Development, Marseilles, September 9.Oxford: Oxford University Press.
Searle, R., G. Casella & C. McCulloch. (1992). Variance Components. New York: Wiley.
Soper, D.S., H. Demirkan, M. Goul & R. St. Louis. (2006). The impact of ICT expenditures on institutionalized democracy and foreign direct investment in developing countries, Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06) Track 4, p. 65b
Stiglitz, J.(1989). Economic organization, information and development, In Behrman, J. and Srinivasan, N. T.(eds.), Handbook of Development Economic, Amsterdam.
Tan, F. Leewongcharoen, K(2005). Factors Contributing to IT Industry Success in Developing Countries: The Case of Thailand Information Technology for Development, 11 (2), 161–194.
Tan, Z. (2004). Evolution of China's Telecommunications Manufacturing Industry: Competition, Strategy and Government Policy, Communication & Strategies, No 53.
The Heritage Foundation (2008). 2008 Index of Economic Freedom. Retrieved from www.heritage.org/Index/
The World Bank. (2005), Financing information and communication infrastructure needs in the developing world: Public and private roles.
The World Bank (2006a). Information and Communications for Development,

Global Trends and Policies.
The World Bank. (2006b). Information and communications for development, global trends and policies.
The World Bank (2007). World Bank Development Indicators (WDI) CD-ROM
UNCTAD (2002), World Economic downturn is over, but regional conflicts pose threat. Retrieved from: http://www.unctad.org/Templates/webflyer.asp?docid=2469&intItemID=2079&lang=1
UNCTAD (2004). Higher Education and ICT Development in Iran, STD panel meeting 27-29 Oct ,2004. Retrieved from: stdev.unctad.org/unsystem/cstd/iran0410.ppt
UNCTAD (2006). World Investment Report 2006, FDI from Developing and Transition Economies: Implications for Development.
UNCTAD (2006a). World Investment Report 2006: FDI from Developing and Transition Economies: Implications for Development, UNCTAD Handbook of Statistics 2006-07.
UNCTAD (2006b). Information Economy Report 2006, The development Perspective.
UNCTAD (2008). World Investment Prospects 2007–2009, Retrieved from: http://www.unctad.org/en/docs/wips2007_en.pdf
UN ICT Task Force (2005), Information and Communication Technology for Peace - The Role of ICT in Preventing, Responding to and Recovering from Conflict, UN ICT Task Force Series 11.
UNDP (2001). National human development report 2001, Doi Moi and Human Development in Viet Nam.
UNDP (2006).Human Development Reports, Statistics of the Human Development Report, Retrieved from: http://hdr.undp.org/en/statistics/
see also, http://hdr.undp.org/en/media/hdr05_complete.pdf
Verbeke, G. & G. Molenberghs. (2000). Linear Mixed Models for Longitudinal Data, New York: Springer.
Wei, S. (2000a). Local Corruption and Global Capital Flows, Brookings Papers on Economic Activity 2, 303-346.
Wei, S. (2000b). How Taxing is Corruption on International Investors? Review of Economics and Statistics, 82(1), 1–11.
White, H. (1980). A heteroskedastic-consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica,* 48 ,817-838.
Zain Financial Reports (n.d.). 2005 and 2006 Annual Reports. Retrieved from: http://www.zain.com/muse/obj/lang.default/portal.view/content/Investor%20relations/Financial%20Reports

Appendix A

Pair-wise correlations between independent and dependent variables (Figures 1, 2 and 3)

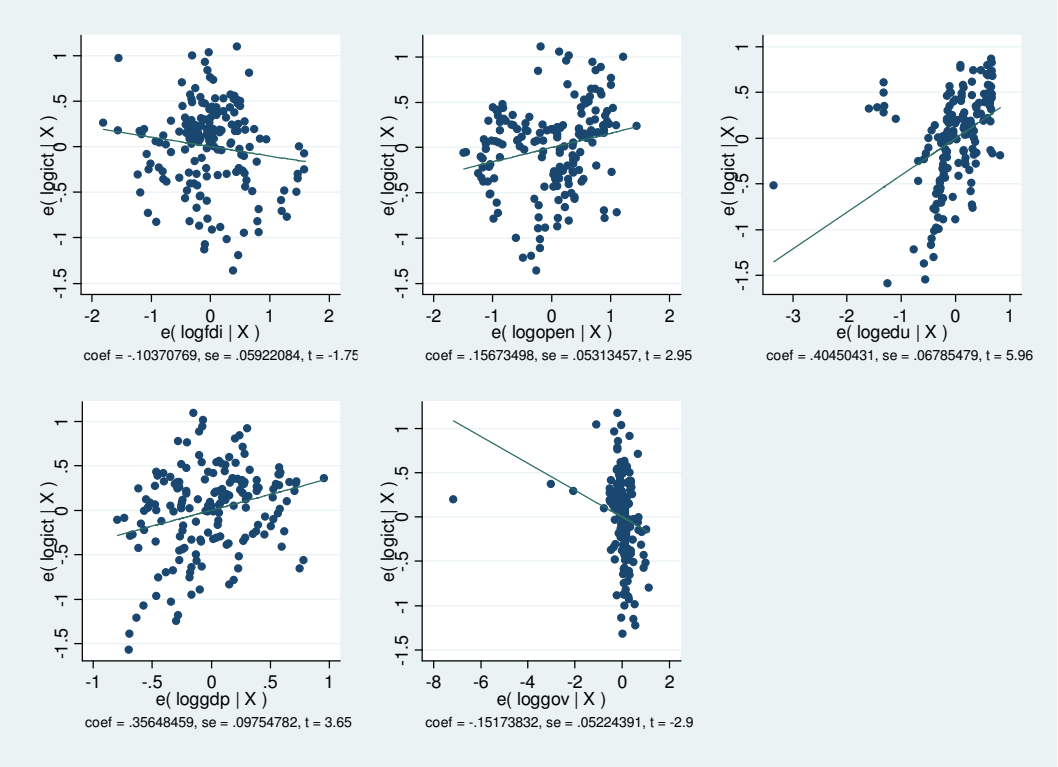

Figure 1. *Asia-Pacific and Middle Eastern countries*

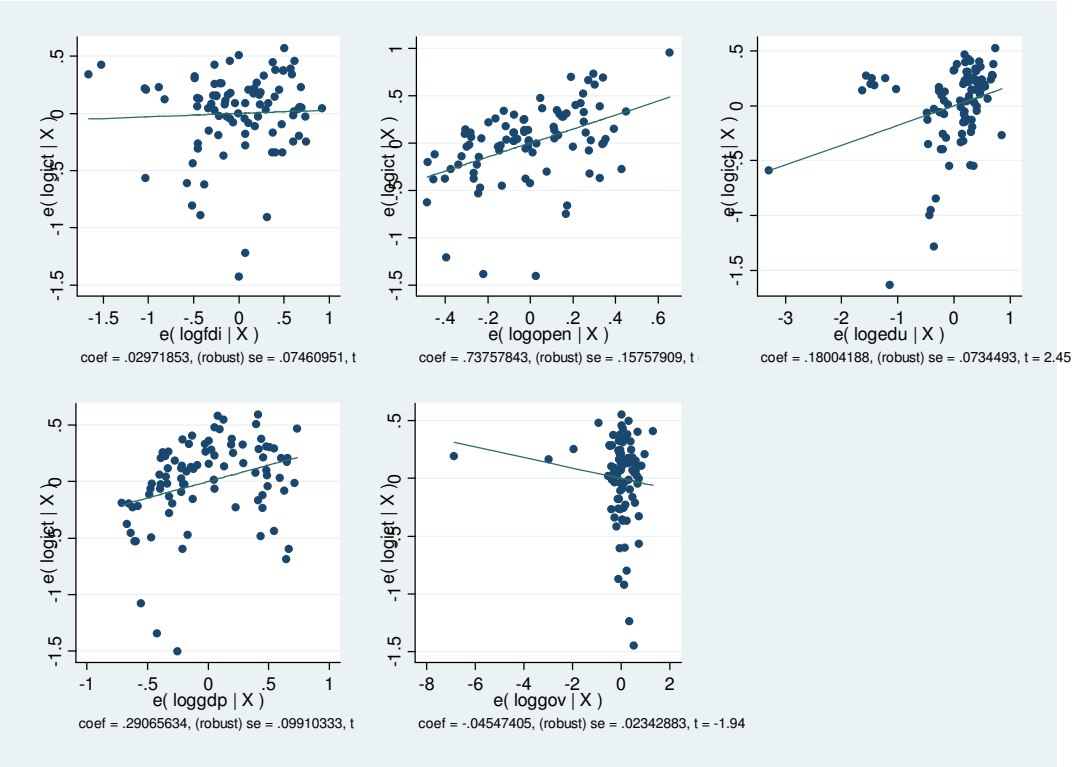

Figure 2. *Middle Eastern countries*

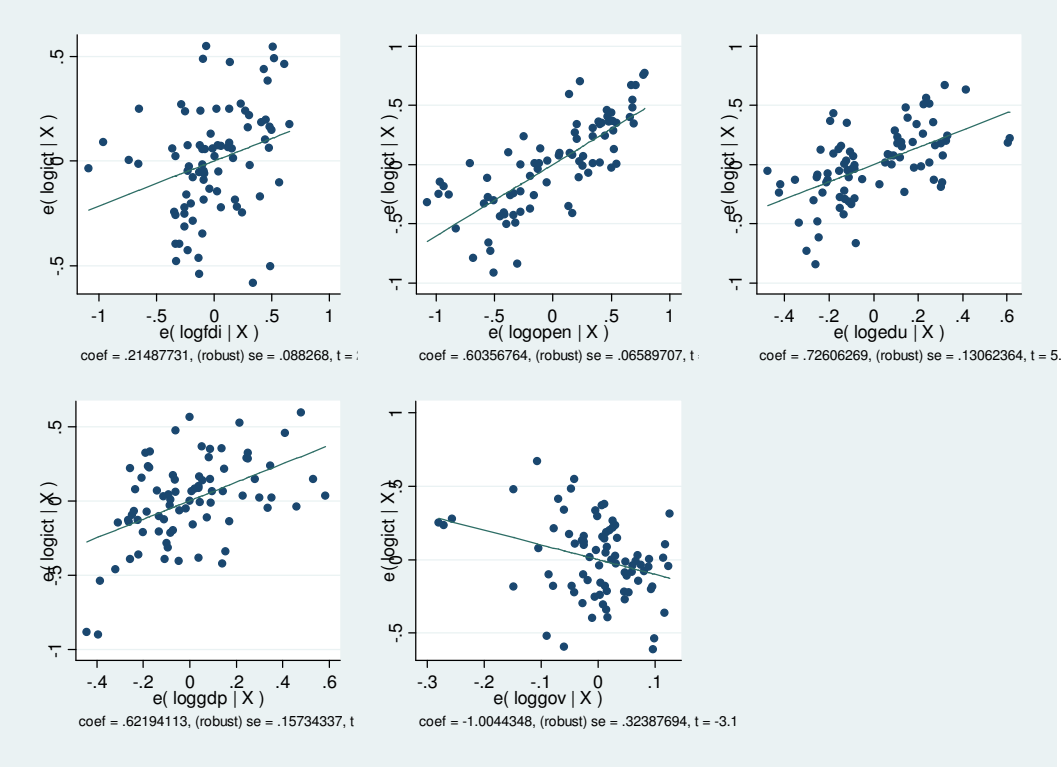

Figure 3. *Asia-Pacific countries*